Subjectively Objective: Scientific Justification as a Power Strategy

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INTRODUCTION

While racism and segregation are not modern phenomena, the nineteenth century's embrace of racial categorization as a means of classifying people in a seemingly natural way was highly connected to the adoption of experimental methods during the Scientific Revolution. The term "race" developed a new definition due to this application as an innate human feature inextricably connected to contemporary social theory and to the subjugation of state-established "unit races." The progression of scientific thought brought about a period of time, roughly 1850-1930, where environmental determinism was overshadowed by the concept of biological determinism. No longer were groups different solely on a conceptual level; scientists were capable of providing quantifiable evidence to support the existing opinions of a hierarchical society and to delineate "others" as categorically different.

The seventeenth and eighteenth centuries were a period of time in which scientific fields began advancing most rapidly since the ancient philosophers, an era which has become known as the Scientific Revolution, and marked a turning point in the proliferation of scientific thoughts and practices through the establishment of a new paradigm centered on experimentation. Although this period is not defined by a single incident, discovery, or observation, scientists of the seventeenth century challenged the previous conceptualization of the natural world and their life's work was distributed amongst academic institutions at a revolutionary rate thanks to the printing press and the establishment of scholarly networks. The advancement that definitively liberated science previous scientific paradigm, one based in religious explanation, was the rise of experimental methodologies. Newton saw

experimentation as establishing “his theory beyond reasonable doubt" and therefore the cornerstone of natural philosophy and science.[1]

Within the fields of natural philosophy, the collection and treatment of data took on a revolutionary new life as well. Prior to the nineteenth century, identification based on physical appearance was the name of the game. By the mid-nineteenth century, this practice was applied to society and identification and classification became the preliminary steps towards an understanding of the social world. As white, male, European scientists defined absolute categories for human phenomena, rank and meaning were assigned to each and an inescapable hierarchy was created. Racial biases were clear in the results of scientifically reasoned studies and thus the biological sciences became a tool with which to scientifically justify racism as implemented in social and governmental policy.

By the end of the nineteenth century, an experimental methodology was standard and had become an essential part of governance in the democratized West where empirically backed results were interpreted by citizens as irrefutable facts and thus must be accepted.[2] The illusion of coming to objective conclusions was created by simplifying populations of analysis based on attributes which could not simply be quantified, thus reducing the subjects to objects and distancing the research from the implications of their results. The use of what appeared to be objective results were vital to the state which sought to justify their authority and superiority over not only imperial populations, but also over select domestic groups. State-supported racialization was not strictly a Western occurrence but rather reflected their imperialistic goals: if the state desired to be a modern imperial power, they would racialize

[1] Morus and Bowler, 48.
[2] Porter, Rise of Statistical Thinking

populations in their acquired colonies, such as the French in Haiti and the Japanese in Korea, in order to impose a superior-inferior paradigm.

Scholarship from the nineteenth century and early twentieth century, the period to be examined, describes the new level of influence academia had in the orchestrating of governmental policies as it was the sciences who were able to procure results complementary of the state's high and mighty sense of superiority as well as convince their populations of its validity. Within this context, racial classification became a widely used measure to differentiate populations and subsequently led to the firm, popular belief that one's "race" was a natural category as well as their most defining characteristic. Since the late twentieth century, it has become widely accepted that the basis of "separating us from them is belligerent, constructed, and situational" with no physiological or rational backing and, therefore, not a natural category.[3] Results of this nature emerged in several different yet overlapping areas of study, and while the instances of this practice are countless, this paper will explore specific case studies and historiographies of the new forms of biology as they were applied to society, and the standardization of statistics as a means of enumerating the social world.

It is from here, understanding the modern usage of the term "race" as a socially constructed means of classification meant to proclaim dominance, that an analysis of its origins in the sciences can be traced. First, concepts within the nineteenth century's new fields of biology will be examined as they were applied to society and human bodies. Evolutionary principles were used to explain differences amongst populations and to justify Western superiority, the enslavement of particular groups, and the sterilization of individuals with

[3] Gregory, 24.

certain characteristics. To exemplify the biological rationalization of such belief, topics including Social Darwinism, craniometry, phrenology, exhibition, and eugenics will be explored. Following this will be an examination of the problems inherent with the use of statistical analysis on social phenomena along with persistent practices such as intelligence testing.

NEW BIOLOGY

Prior to the adoption of Darwinian evolutionary theory in the late nineteenth century, racial inferiority was reasoned scientifically with the principle of environmental determinism. This eighteenth-century doctrine was meant to offer causal explanations across space so as to impose ideas on people all across a world conceived as containers of totalized populations where environmental conditions were the most influential factors in defining the abilities and potential of a people. Throughout the nineteenth century, climate and cranial capacity, inferred based on skin color and body stature, were identified as the main determinants of a race's potential for intelligence based off of the standard of North and Western Europeans as the ideal and most conducive to intellectual advancement.[4] This belief that climate was capable of causing such an impact on populations was well within the Lamarckian school of biological thought where traits acquired throughout one's life could be inherited by offspring. From this, some, such as Samuel Standhope Smith, then the president of the College of New Jersey, believed that the American climate would turn American blacks white because the

[4] Gould, 37.

climate was more similar to Europe than to Africa.[5] This theory persisted because when applied to people, the characteristics were based on physical appear or temperament and conclusions were made to support the idea that light skin was superior to dark or colored skin and features associated with northern and western Europeans as superior to any others.

The essence of environmental determinism is that evolutionary success depends on location, but location in this theory is not defined as a permanent state, thus allowing for opportunities of self-determined advancement. One pursuer of this logic was Herbert Spencer (1820-1903) who coined the term "Social Darwinism" in the 1880s as an application of evolutionary theory onto society.[6] Despite the name, Spencer's logic was Lamarckian, not Darwinian, in nature and was influenced by his belief that people always had some level of control over their lives, and in turn, the lives of their descendants. Lamarck's, and later Spencer's, concept of self-determination was attractive to many living in the day's strict social structure because this allowed them some sense of control over their lives and legacy. Darwinian thought, on the other hand, saw individuals as having no such control, rather one's evolutionary success was determined through natural selection and other biological processes.[7]

Charles Darwin (1809-1882) published his work *On the Origin of Species* in 1859 where he documented his research on the Galapagos Islands as well as his interpretations of natural selection. While this work is hailed as the origin of evolutionary thought, Darwin never actually used the term "evolution" but rather documented the mechanisms involved in the evolutionary process. One such mechanism was the infamous "survival of the fittest", a

[5] Gould, 39.
[6] Lecture 9/27/2016.
[7] Lecture 9/22/2016.

concept Spencer claimed was the central driving force of evolution and that it could be applied to the individual, population, and national scales.

Scaling up from the individual, by the late nineteenth century, evolutionary theory began to be applied to society at large and was reflected in social policies such as immigration reform and marriage laws. The high levels of immigration experienced from 1900-1920 led some Americans to fear that immigrants would taint the American gene pool and result in the degradation of the nation as a whole.[8] During this same period, thirty states enacted marriage laws to "prevent the marriage of the mentally deficient" and to nullify those unions which had already been made amongst unfit couples.[9] In Western Europe and the United States, biological determinism, seen in the practice of identifying characteristics rendering persons and populations as "fit" or "unfit," was explicitly used to argue against welfare policies and to facilitate the implementation of others. Those classified as "unfit" included the unemployed, sick, disabled, low skilled, feebleminded, or those afflicted with a venereal disease and the common link between them all was that they required state support in order to survive.[10] However, the act of assisting such people was interpreted as counteracting the natural order of things where the weak perish and a full adoption of these types of aid programs would ultimately result in the hindrance of state progress.

The hegemonic governments of Western Europe presented empirical support for the differentiation between these two categories with the use studies of phrenology and craniometry. Phrenology was predicated on the belief that one could determine the constitution of a person based upon the construction of their skulls by identifying features

[8] Kevles, In the Name of Eugenics, 97.
[9] Kevles, In the Name of Eugenics, 99-100.
[10] Kevles, In the Name of Eugenics, 99-100.

such as facial angle, skull shape, degree of jaw extrusion, and frontal versus posterior cranial capacity. The reasoning behind this, also referred to as recapitulation theory, was that "savages were [believed to be] cultural relics of the past, frozen at a stage of development passed through by [white] Europeans thousands of years earlier," resulting in evolutionary and physical differences between populations. [11] In the 1880s German anthropologist Wilhelm Waldeyer (1836-1921) claimed that among similar populations, "there were empirically discernible types [of humans] that exhibited corresponding and unchanging essences" where one could "identify these racial components…through the accurate measurements of skulls and facial bones." [12] From here, Waldeyer divided "the human species into distinct races."[13]

The "Empiricist of Phylogeny," Samuel George Morton (1799-1851), and his disciple Paul Broca (1824-1880) were notable physical anthropologists who gained recognition for their careers accurately measuring human skulls. Morton alone housed a collection of over six hundred human skulls, mostly of Native American origin stemming from various tribes, and he used this collection to test his hypothesis that the "physical characteristics of the brain, particularly its size," had a direct influence on mental capacity.[14] The measurements taken to gauge cranial capacity were initially done with mustard seeds, but this method was found to have too much natural variation amongst the seeds and therefore produced inconsistent results for the same samples, so the more uniform and smaller lead shot pellets were adopted. Based on the various cranial measurements both Morton and Broca collected, the data was tabulated and averaged by population groups and later categorized by race. Through an analysis taking

[11] Bowler and Morus, 307,417-419.
[12] Kim, 417-418.
[13] Kim, 417-418.
[14] Gould, 51.

only cranial capacity into account, Morton concluded that an increased cranial size was correlated with higher levels of intelligence. Broca also concluded that "there was a remarkable relationship between the development of intelligence and the volume of the brain."[15] These results mirrored a more ancient evolutionary hierarchy conceived by Plato and reintroduced in medieval Europe, the Great Chain of Being, where celestial beings were the only ones superior to the white man. However, Broca now possessed an anthropological explanation for their placement so high on the hierarchy, their apparent larger cranial capacity, and thus empirical vindication for the existing cultural prejudices by rooting them in biological evidence.[16]

While the philosophy of racialization was debated due to difference in the interpretation of how the self could be defined, the nature of racialization was indubitably motivated by power. Regardless of class or economic status, if one were part of the white European race, they were superior to some other group: racial classification had "become a line of exclusion far clearer than it had been before" now that societal worth could be determined based on the color of one's skin.[17] The absoluteness achieved by racial categories resulted in a select few having undue influence over the definition of what it meant to be "modern" or "advanced."[18] The prejudices of the "definers" are apparent in the biased categorization of certain people, such as acclaimed anatomist and ethnologist Robert Knox of Britain who was widely known to be biased against the Irish and the Dutch Boers - for their

[15] Gould, 83.
[16] Gould, 53-54.
[17] Stoler and Cooper, 10.
[18] Bowler and Morus, 421.

inhumane treatment of native South Africans - whom he ranked much lower than the groups whom he preferred.[19]

This classification of populations as 'fit' necessitated the existence of an 'unfit' category as a point of reference, and when applied to populations abroad, the distinction followed racial lines where 'fit' became synonymous with the 'civilized' white race and 'unfit' with distant, colored 'savages'.[20] Physical anthropologists of the early to mid-nineteenth century collected data on various populations, generalized certain characteristics to a group such as low facial angle among blacks, and concluded that a singular characteristic was a totalizing feature of a primitive versus advanced status. Resoundingly it was the Europeans who were privileged with defining the criterion for modernity which reflected their admiration of technological advancement, rationality, Christian values, reason, and a drive for progress and thus were all key determinants in the classification of populations.[21]

The peak of scientifically-reasoned racialization corresponded with the period of Classical Imperialism, roughly 1880-1910, where the connection between neocolonialism and Social Darwinism is most apparent. The period of Classical Imperialism was marked by the shift in focus from the Americas towards Africa where the primary imperial objectives were economic and environmental exploitation, as opposed to traditional colonial settlement. Territorial control was therefore enforced militarily instead of through assimilation or community building initiatives among the natives. At the Berlin Conference of 1884, the continent of Africa was arbitrarily carved up on a map and allocated to the various European powers involved. Imperial states realized the need for widespread support from their people in

[19] Bowler and Morus, 422.
[20] Bowler and Morus, 155.
[21] Stoler and Cooper, 3.

order to dominate another population, and in order to shine a positive light on these military efforts, anthropological studies "manipulated [descriptions of race] to make it seem that the colored races were inferior to the whites" and otherwise incapable of governing themselves or advancing their society without a European presence.[22] The route which the state took in order to convince the public of their racial superiority was through the increased accessibility to exhibitions as a cultural attraction, the World's Fair and the World's Columbian Exhibitions being examples of extremely popular transnational exhibitions.

The act of exhibition stereotyped the cultures of a region in order to highlight the differences between "*that* unfamiliar" culture and "*this* familiar" one. In order to give a patron a sense of cultural immersion, people would be imported in order to be showcased alongside only a selection of their cultural traits, typically art and ceremonial dances, for the exhibit which was curated by the host country. These foreigners were taken out of the context of their original environment to be put on display, resulting in the false representation of diverse ethnic groups who had been lumped together and whose customs overly simplified. The goals of these exhibitions was not to learn racial tolerance but rather to highlight the extent of the differences between "us" and "them." This traces back to the concept of inferior races as "savages" or as an evolutionary primitive specie of human, as relics of the past meant to be observed as if in a museum.

Exhibitions took place in countries which recognized themselves as modern, accentuating this title with the juxtaposition of "primitive" and "other-worldly" cultures showcasing the Orient's technological primitiveness alongside the modern marvels of

[22] Bowler and Morus, 421.

European and American cities.[23] The World's Fair of Chicago in 1889 extensively built infrastructure to represent the Oriental world which captured the key architectural features of different cultures literally in the shadow of the world's first Ferris Wheel. The fairgrounds were intentionally designed to promote a calculated amount of chaos within the interactive exhibits in order to keep patrons on edge and feeling strange. The chaotic experience of visiting the World's Fair was remedied through the distribution of information pamphlets which explained each exhibit with the intention of the patron becoming reliant on the event organizers to explain these otherwise "not understandable," distant cultures. The reliance of an explanation to understand a culture deepened the sense of difference between the observer's culture and that of the observed. By comparing the elements of the exhibit which showcased "their" primitive instruments against the modern backdrop of the industrialized host city, it was nearly impossible for patrons to reach any conclusion other than their superiority over the people they just witnessed.

Similarly, exhibition was used as a tool to popularize eugenic principles from 1884 to the mid-1920s.[24] Sir Francis Galton (1822-1911), the founder of the eugenics movement, "set up an 'anthropometric laboratory' at the 1884 International Health Exhibition in London where some 9000 visitors paid a modest fee to have various components of their strength, quickness, and intelligence measured."[25] While patrons viewed this as an attraction, Galton was using it as an opportunity to collect data from a wider population about "the distribution of merit in society."[26] In the United States, Fitter Families competitions sponsored by the

[23] Mitchell, 219-223.
[24] Kevles, In the Name of Eugenics, 61-62.
[25] Porter, The Management of Society by Numbers, 102.
[26] Porter, The Management of Society by Numbers, 102.

American Eugenics Society popped up at state fairs from 1920-1930s.[27] All families were eligible to enter these competitions but were required to provide a full eugenic family history, have a medical examination done, and take an intelligence test. At the 1924 Kansas Free Fair, the contending families fell into three categories – small, average, and large – and the winners of each "were awarded a Governor's Fitter Family Trophy" and "Grade A Individuals" were awarded medals.[28] A brochure commented that "this trophy and medal are worth more than livestock sweepstakes or a Kansas oil well. For health is wealth and a sound mind in a sound body is the most priceless of human possessions."[29]

Often accompanying these eugenic exhibits were exhibits depicting the laws of Mendelian inheritance, or rather, of single-gene inheritance. At the 1929 Kansas Free Fair, charts illustrated how traits would be handed down through generations as exemplified by the colors of guinea pigs.[30] These exhibits described this pattern as being transferrable to human traits such as "feeblemindedness, epilepsy, criminality, insanity, alcoholism, and pauperism," however, single-gene inheritance had widely been accepted by the scientific community to only apply to very simple traits such as those in Mendel's original experiments.[31] In 1926 at the Sesquicentennial Exposition in Philadelphia, "the American Eugenics Society exhibit included a board which, like the population counters of a later day, revealed with flashing lights that every fifteen seconds a hundred dollar of your money went for the care of persons with bad heredity, that every forty-eight seconds a mentally deficient person was born in the United States, and that only every seven and a half minutes did the United States enjoy the

[27] Kevles, In the Name of Eugenics, 61-62.
[28] Kevles, In the Name of Eugenics, 61-62.
[29] Cited in Kevles, In the Name of Eugenics, 61.
[30] Kevles, In the Name of Eugenics, 62.
[31] Kevles, In the Name of Eugenics, 62.

birth of 'a high grade person … who will have the ability to do creative work and be fit for leadership.'"[32]

Exhibitions and attractions praising eugenic research in the early 1920s proved significant in creating public awareness and promoting public acceptance of the alleged impacts racial intermixing could have on the American population. The arguments of prominent eugenicist Charles Davenport popularized the ideal in the 1910s that "each race had a fixed identity and that in racial hybrids – the result of race mixing – the inferior traits of individuals would be preserved."[33] While this statement counters the Darwinian evolutionary concept where only traits most supportive of survival are preserved, the discourse surrounding scientific explanations of social evolution were overwhelmingly positive and difficult to refute. It is from this context that the voice of those who believed in the power of eugenics were so prominently featured in the immigration debates of the early 1920s.[34] Both houses of Congress had members who believed that immigration restriction on Eastern and Southern Europeans was "the necessity for purifying and keeping pure the blood of America" based on intelligence tests administered to immigrants and military personnel – to be discussed further in the next section – which concluded that the mental inferiority of immigrants as a threat to American prosperity.[35]

From these debates, the Immigration Act of 1924 was signed into law with an overwhelming majority in both the House and the Senate. The Act would limit immigration from any European country through the year 1927 "to a small percentage of the foreign-born

[32] Kevles, In the Name of Eugenics, 62
[33] Zuberi, 51.
[34] Kevles, In the Name of Eugenics, 97.
[35] Kevles, In the Name of Eugenics, 97.

[population] of the same national origin recorded in the census of 1890," a year selected because there were fewer Southern and Eastern Europeans than 1920.[36] This Act exemplifies the political influence of the new branches of biological thought stemming from the initial application of biological principles onto society in the 1860s. The biological sciences were not alone in extending scientific methodologies into the realm of society nor in the quantification of social phenomena: developments made in statistical analysis and applications of statistics were key in the normalization of racial differences.

SOCIETAL ANALYSIS

Throughout the nineteenth century, various government agencies in Europe and the Americas expanded their use of enumerated census activities and with this unprecedented level of social data, statistics was able to branch out into a "new area of study – society."[37] This data revolution allowed for the social science, such as economics and sociology, to perform quantitative analysis based on their ability to provide social "data for understanding society" through a statistical lens thus employ "the 'authority' of statistics to legitimate their claims" about the fitness of society or class and race based analyses of superiority.[38]

A basic principle of statistical analysis first imagined in 1718 by Abraham de Moivre is the bell curve, or normal curve, and later adapted by Adolphe Quetelet in 1835 based on the idea of "the average man" being the most common in society with a relatively low proportion

[36] Kevles, In the Name of Eugenics, 97.
[37] Zuberi, 35.
[38] Zuberi, 30, 74.

at either extreme of the chosen spectrum.[39] When applied to society, patterns among the chaos were capable of being discerned because the occurrence of events can be statistically modeled as a curve, simply requiring a number of instances observed at both extremes and the most instances observed towards the central value. Due to its empirical nature, statistics were seen as capable of "representing the truth of facts, not to subserve some immediate purpose of administration of legislation" and therefore producing inherently objective conclusions.[40] Data collection among populations became more and more omnipresent in European society as studies were conducted to gauge particular interests, such as the geographies of disease and poverty. The results of such studies were mapped and recognized as reasonable, confirming the popular belief that conclusions based on statistics were unarguably the truth.

As already established with Social Darwinism, however, the application of mathematical and logical principles to the study of humanity introduces a myriad of biases when less understood and unquantifiable characteristics, such as intelligence, are assigned an empiric value. In justifying claims with the use of statistics, "expectation is a powerful guide to action," heavily influenced based on the lived experiences and internal biases of the researcher.[41] Preconceptions of racial superiority or of ethnic differences affect the objectivity of the study as the experiment is designed to reach a chosen conclusion. This renders any interpretation or explanation of the results as inherently influenced by the researcher's initial conclusion. As many social and human studies have no means to *test* the effects of differences found, conclusions could only be reached by *personally interpreting* collected observations.

[39] Lecture, 9/29/2016.
[40] George Cornewall Lewis, Lecture, 9/29/2016.
[41] Gould, 65.

While it is not always a conscious effort to create results mirroring expectation, factors which would have an influence on the results of an analysis are not always properly addressed. An example of this would be physical anthropologist Samuel Morton and his measurements of cranial capacity early in the nineteenth century. Throughout his extensive work with human skulls, he did not properly deal with variation within and between groups nor with the effects of physical stature on cranial capacity into consideration. Morton's 1849 study of cranial capacity by race identified five different classes: Caucasian, Mongolian, Malay, American, and Ethiopian.[42] In-group variation, particularly within the American group, was not considered which meant that the various Native American tribes represented were weighted unequally and resulted in inaccurate conclusions. The Incans as a population had much smaller skulls than Iroquois due to their difference in stature and Incan skulls constituted a much larger proportion of the sampled skulls and thus lowered the overall measurement for the American group, bringing the mean a full five cubic centimeters below the Caucasian mean.[43] Due to an inconsistent distribution of the sexes within and between samples, the average cranial capacity within groups was effected because men are typically of larger stature than women and therefore have larger cranial capacity. What is not reflected in the data, however, is that it had been previously established that no direct correlation existed between physical size and intelligence. The results of this gender oversight is reflected in Morton's sample of skulls used to generalize the Hottentot population. The group had been recognized as smaller in stature than any other African population and the sample of skulls

[42] Gould, 54.
[43] Gould, 56-60.

measured were all from females which made the results of cranial capacity for this group unnecessarily low ad further unrepresentative of broader African populations.[44]

This imposition of scientific practices onto colonially dominated populations was not strictly a Western phenomenon, as seen with the neocolonial world power of the east; Japan. Korea was an independent empire from 1897-1910 and then became a Japanese colony, but for the two hundred years leading up to full Japanese control, Korea had been within the Japanese sphere of influence and strategically used by the Japanese who sought to gain a stronghold on the mainland continent for defense against Qing China. Japan was seeking to prove its "place in the greater scheme of global racial hierarchy" "as the only non-white modern imperial power" and thus they sought to westernize their scientific endeavors to match European objectives.[45] Between 1868 and 1914, thousands of Japanese medical students went abroad to Germany to fulfill Japan's desire to become a modern world power.[46] Through this exchange, the Japanese were introduced to the German's "obsession with the study of race" which, when applied to the Japanese context, lead to extensive anthropological studies of the imperially dominated Korean people.[47]

The Japanese state funded anthropological expeditions to get empirical evidence of the physiological differences of Koreans from Japanese in order to explain the disparities in societal advancement. Kubo Takeshi, a Japanese physical anthropologist, regarded Koreans and Japanese as "already distinct ethnic, racial, and national groups" before embarking on an exhibition of Korea from 1907 to 1910.[48] Over the course of three years and the measurement

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[44] Gould, 61.
[45] Kim, 413, 425.
[46] Kim, 413.
[47] Kim, 413.
[48] Kim, 422, 419.

of 3,425 Koreans, each with at least 105 measurements taken per subject, Takeshi maintained that, "anatomically speaking, Koreans were barbarians whose racial traits determined their historical development."[49] His belief of the existence of distinct differences between Koreans and Japanese is reflected in his ready assignment of an inferior status to any observations found to be unique to Koreans.[50] This bias was present among other interpreters of craniometrics data concluding that, along with white races having a larger capacity for intelligence than colored races, people of higher social status and within academia were reasoned to have larger skulls than lower classes and those of "mediocre talent."[51]

As a way to more readily apply anthropological and physiological theories of mental capacity and aptitude for success, tests of general intelligence to determine one's "mental age" were developed.[52] Prominent American psychologist Henry Goddard stated in 1906 that intelligence was "a condition of mind or brain which is transmitted as regularly and surely as color of hair or eyes."[53] The idea of intelligence as a heritable trait is linked to Mendel's study of inheritance popularized in the late 1890s. The conclusions which proliferated from Mendel's study, however, only referred to single-gene inheritance, and therefore it would be inappropriate to apply such a theory onto a feature as complex as the intelligence of a human. By the late 1890s, Sir Francis Galton was among the first to draft a test to determine if intelligence was a heritable trait. Though his results were inconclusive, the way in which the tests were administered is noteworthy because they did not require any reading skills, math

[49] Kim, 412.
[50] Kim, 419-420.
[51] Lecture, 10/4/2016.
[52] Herrnstein and Murray, 4.
[53] Kevles, From Eugenics to Genetic Manipulation, 303.

skills, or other key culturally biased tasks as compared to the tests created by his followers.[54] Alfred Binet created an intelligence test in 1904 which "attempted to measure intelligence by measuring a person's ability to reason, draw analogies, and identify pattern."[55] The results of Binet's tests matched the ideas previously accepted of which groups possessed higher and lower levels of intelligence, meaning this test gained validity despite the increased cultural biases introduced by the content of his test.

Intelligence tests were not explicitly designed to be disadvantageous to non-whites or non-Westerners, great thought was put into selecting material which could produce what they conceived as a reasonable measure of intellect, however, there were substantial problems with the administration of tests which lead to highly biased results. Disadvantages included a difference in language between the proctor and subject, the subject's unfamiliarity with such a situation, feelings of discomfort or intimidation, and the process involved with selecting participants.[56] For the testing of immigrants, spotters, typically women, were sent to ports of entry in gateway cities such as New York where they would identify people who exhibited features thought to be the result of feeblemindedness. The results of these tests were used to justify the strict immigration laws and quotas of 1924 which limited the influx of populations already labeled as undesirable, predominantly Eastern and Southern Europeans, by citing these populations' low intellectual stratum and that their continued integration would lead to the deterioration of American society.[57]

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[54] Herrnstein and Murray, 2.
[55] Herrnstein and Murray, 2.
[56] Herrnstein and Murray, 630.
[57] Gould, 166; Kevles, In the Name of Eugenics, 97.

Intelligence testing became more widely used as a result of its success in World War 1 when these tests were used to determine a soldier's aptitude for a position. These tests were applied more broadly to common people and the results attempted to explain why certain races were successful in America and at what types of things they were more likely to excel.[58] When faced with controversy in the 1960s and 1970s over the objectivity of the results of such tests, focus shifted from the inheritability of intelligence strictly through genes to the inheritance of socioeconomic standing as the root cause of lower levels of intelligence amongst populations.[59] This transition towards a socio-economic explanation of variation in intelligence levels became a prominent approach for modern psychological studies since the 1930s with the premise that one's position in society – impoverished or wealthy, colored or white – was the trait inherited and the dominant explanatory attribute. The downfall of such studies is that, as Binet proclaimed, "Intelligence is too complex to capture with a single number," meaning a simple measure such as IQ or socio-economic status cannot fully explain why a person succeeds and why another does not.[60]

POWERFUL SCIENCE

The use of newly quantitative branches of science popularized in the late nineteenth century, particularly subfields of sociology and physical anthropology, was highly influential in the political arena where scientific conclusions became a tool with which to exert and justify power over populations. Eugenic policies succeeded in the United States at the turn of

[58] Herrnstein and Murray, 301.
[59] Herrnstein and Murray, 8.
[60] Gould, 151.

the twentieth century because of the authority, and expectation, of science's involvement shaping public policy.[61] Debates on immigration in the early 1920s "argued that 'biology' demanded the exclusion of most members of the Eastern and Southern European 'races' based on the work of eugenicists' intelligence testing.[62] The strategic use of academic and scientific fields thus proved to be a powerful tool in the shaping of twentieth century perceptions of racial superiority based on the political influence these fields gained.

The implementation and proliferation of scientific methods and methodological practices is not an inherently negative occurrence. Scientists of every breed have sought to "discern the larger philosophical significance" of the natural and biological sciences, "to find meaning in the fact of our evolution and to apply insights from evolutionary biology to ethics," and uncover the absolute truths of the world around them.[63] Analyses based purely on numbers were viewed as impossibly subjective, the epitome of reasonable, and therefore as close to this absolute truth so deeply longed for. However, "science is always and already entangled with the state and political questions…and the question of power is always and already in the practice of science itself," and therefore context is selectively analyzed, giving life to certain results and removing it from others.[64] Numbers no longer solely resided on a number line; they found place in rank and in tabulated models and came to be figures ungrounded from context, capable of being combined and rearranged so that patterns of the social world could be readily identified.[65]

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[61] Kevles, In the Name of Eugenics, 101.
[62] Kevles, In the Name of Eugenics, 97.
[63] Kingsland, 417.
[64] Pestre, 63.
[65] Porter, The Management of Society by Numbers, 97.

The English political economist and statistician Sir William Petty (1623-1687) established the field of political arithmetic, "which he defined as the art of reasoning by figures upon things relating to government."[66] Political arithmetic gained further use throughout the eighteenth and nineteenth centuries when it was believed that the state's "wealth and strength…depended strongly on the number and character of its subjects," and therefore the monitoring such social numbers was imperative in directing patterns of social transformations.[67] In practice, this meant the collection of information on disease outbreaks (particularly of cholera in industrial Britain), instances of crime, (rates of which began to be published in the 1820s), and other social phenomena such as unemployment.[68] When spatial patterns of these social phenomena were uncovered, they were interpreted as social problems with social causes, a clear step away from the previous doctrine of environmental determinism, therefore leading to a solution which was "an important element of *public* responsibility."[69]

The categorization of social characteristics as "social problems" repositioned responsibility from the state, and their systemic modes of oppression, to the public and particularly the impoverished and otherwise "unfit" in the eyes of the government. Studies which came to such conclusions were dense with data and statistical figures, making them "look and sound scientific" and as they were "usually promulgated by reputable scholars [and officials], great weight was accorded to them, even if their import was in fact distorted by subjective predispositions."[70] As discussed previously, the practice of enumerating social data

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[66] https://www.britannica.com/biography/William-Petty
[67] Porter, Rise of Statistical Thinking, 19; 30.
[68] Porter, Management of Society by Numbers, 101.
[69] Porter, Management of Society by Numbers, 101, emphasis added.
[70] Zuberi, x.

leads to oversimplified conclusions of highly complex and unmeasurable subjects, the downfall of overarching inferiority-superiority status assignments and any form of racial categorization.

The need for such oversimplified conclusions relates back to the time of western democratization, marked by the French Revolution's toppling of the monarchy and subsequent creation of the Republic in the 1790s, as the beginning of an era where the government "was itself constrained by society."[71] The end of Old Regime hierarchies, where the government ruled unchecked, allowed for citizens to increase their level of influence over the workings of the larger political body and increasingly, decisions were rooted in rational, empirical thought rather than the traditional dictums of the church.[72] With public participation thoroughly implemented by the 1850s, convincing arguments justified through scientific logic became the standard for the age of democracy.[73]

The state and international firms interested in expanding their reach overwhelmingly needed to justify their actions to the public in order to gain their support, and in this age of Classical Imperialism where the desired actions involved the subjugation and annihilation of foreign populations and lands, a reasonable explanation for their foreign actions would have to be circulated domestically. Instead of being transparent with the implications of their capital ventures, they cultivated the discourse of their efforts as part of a civilizing mission, mirroring the trope of the "white man's burden" to civilize those deemed biologically incapable of doing it themselves. Tales of barbarous savages in need of civilizing were spread to justify military control over foreign lands, different groups were identified as being a

[71] Porter, Rise of Statistical Thinking, 26.
[72] Porter, Rise of Statistical Thinking, 25.
[73] Porter, Rise of Statistical Thinking, 30.

hindrance to the advancement of the state, and tests to expedite and enumerate the identification process were developed to justify the exclusion of such populations.

The discursive language associated with the negative categorization of certain populations reflects the inescapabilty of dichotomized thinking, where "one group is afforded power and status and the other rendered powerless and inferior."[74] Those who possess the power to define such dichotomies also "have the power to create a world in which they and their priorities, beliefs, and operating procedures are not only dominant, but accepted and endorsed without question by the vast majority."[75] The creation of such dichotomies is a power strategy used to delineate those who have power and those who do not by assigning people with certain attributes as superior over other who do not fit into that category. The widespread Western acceptance of the racialized dichotomies outlined here would not have been possible had their justifications not been rooted in empirical studies relying on social, physiological, and psychological data and presented as seemingly irrefutable conclusions. The existence and persistence of those with specific characteristics, and "unfit" populations in general, was evaluated as problematic for the continuation and advancement of the state, yet the disciplinary actions against them were not designed to punish them. Rather, these were efforts to correct what was seen as a society-wide problem and to have the entirety of the population participating in the rehabilitation of the demographic-composition problem.

By the mid-1930s, many of the principles examined here, significantly the study of eugenics, were largely discredited and, as the acclaimed geneticist Hermann J. Muller wrote in 1935, "had become hopelessly perverted into a pseudoscientific façade for advocates of

[74] Weisman, 10.
[75] Weisman, 10.

race and class prejudice, defenders of vested interests of church and state, Fascists, Hitlerites, and reactionaries generally."[76] By 1950, UNESCO – the United Nations Educational, Scientific and Cultural Organization – issued a "Statement on Race" which summarized the new, internationally accepted "views on the biology of race: [that] the idea of race was merely a convenient tool of classification."[77] The Statement went on to say that differences "between human groups resulted from various combinations of heredity and environment," "racial groupings did not necessarily coincide with ethnic and cultural differences," and that "there was no proof that the groups of mankind differ in their innate mental characteristics, whether in respect to intelligence or temperament."[78] Despite international efforts to overcome the impacts made by over 80 years of highly racialized scientific practices, UNESCO's statement just marked the beginning in an age seeking recompense for the wrongdoings of past generations and the perpetuation of inaccurate and racist cultural perceptions.

CONCLUSIONS

The advancements made as a result of the Scientific Revolution have extended far beyond the laboratory and into the social realm. The proliferation of experimental methodologies introduced new means in which to collect, treat, and apply data and subfields of natural philosophy, particularly the physical sciences such as physics and chemistry, readily adopted these practices. While conclusions rooted in data and reached through statistical analysis were thought to be strictly objective, the personal biases of the researcher

[76] Kevles, In the Name of Eugenics, 164.
[77] Kevles, In the Name of Eugenics, 138.
[78] Kevles, In the Name of Eugenics, 138.

were readily apparent in their interpretations of the results. It became widely recognized that scientific results were representative of the absolute truth, but it was the application of such practices onto society that led to redefining of the term ‘race’ and the stigmatization of this as a natural and totalizing category. With the application of experimental principles onto society and impossibly quantifiable features such as intelligence, science has come to be a tool used to justify the implementation of racist policies and to enforce the imposition of social hierarchies of power based on race.

It was from all of these steps taken by scientific fields since their adoption of experimental methodologies by the nineteenth century that arguments presented as scientific or concluded by statistical analysis would be widely accepted as true and objective. The significance of this is advancement was its use by national governments and other influential bodies as a tool to extend the reach of their power. Domestic as well as imperial populations were enrolled into this system of power which was only possible due to the scientific explanations and justifications of the racialized and discriminatory actions outlined here. Evolutionary principles from the newly articulated field of biology were selectively applied to society in order to explain differences between and within populations. These studies would be based on data detailing a select few characteristics which were arbitrarily quantified and then assigned some intrinsic value which would serve as a totalizing categorization of the observed subject. Biological principles such as Social Darwinism, craniometry, phrenology, and eugenics all contributed to larger political efforts to justify the subjugation, oppression, and exclusion of specific groups by relating certain characteristics with modernity and success while others were equated with savageness and incivility.

Social data from census and other survey activities became widely available by the late nineteenth century and the large collections of numerical data allowed for statistical analysis to be done on a societal scale. As was the case with the application of biological practices, the enumeration and tabulation of social phenomena is problematic because conclusions are open to biased interpretation, certain attributes are not readily quantifiable or capable of wholly explaining complex processes such as intelligence. Intelligence tests gathered at ports of entry from immigrants unfamiliar with the United States were coerced into supplying data that would lead to strict immigration laws arguing that their entrance into the United States would lead to the downfall of the American human stock. In spite of the faulty reasoning leading to these racist conclusions, claims such as this were accepted as the complete representation of the truth due to their scientific and data based justification, and numbers are exceedingly hard to refute.

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